

What is claimed is:

1. A method for forming a single-crystal silicon layer on a transparent substrate, comprising:

2 providing a transparent substrate having an amorphous silicon layer formed thereon and a silicon wafer having a hydrogen ion layer formed therein;

3 inverting and laminating the silicon wafer onto the amorphous silicon layer so that a layer of 4 single-crystal silicon layer is between the 5 hydrogen ion layer and the amorphous silicon 6 layer; and

7 subjecting the laminated silicon wafer and the 8 amorphous silicon layer to laser or infrared 9 light to cause chemical bonding of the single- 10 crystal silicon layer and the amorphous silicon 11 layer and inducing a hydro-cracking reaction 12 thereby separating the silicon wafer and the 13 transparent substrate at the hydrogen ion 14 layer, and leaving the single-crystal silicon 15 layer on the transparent substrate.

16 2. The method as claimed in claim 1, further 17 comprising subjecting the single-crystal silicon layer to 18 high temperature annealing and chemical mechanical 19 polishing thus reconstructing the silicon atoms to form a 20 smooth surface.

1 3. The method as claimed in claim 1, wherein the
2 transparent substrate is glass, quartz, synthetic quartz,
3 LiNbO₃ or LiTaO₃.

1 4. The method as claimed in claim 1, wherein the
2 laser energy is 50~400 mJ/cm².

1 5. The method as claimed in claim 1, wherein the
2 wavelength of the infrared light is 0.7~1.5 μ m.

1 6. The method as claimed in claim 1, wherein the
2 hydrogen ion layer is formed by doping with a dosage of
3 $1 \times 10^{16} \sim 5 \times 10^{17}$ cm⁻² and energy of 10~1000 keV.

1 7. The method as claimed in claim 1, wherein the
2 depth of the hydrogen ion layer is 0.1~15 μ m from the
3 surface of the silicon wafer.